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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/451,619	11/30/1999	SEIICHI MORI	005702-20050	9292

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EXAMINER

WEISS, HOWARD

ART UNIT PAPER NUMBER

2814

DATE MAILED: 08/06/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/451,619

Applicant(s)

MORI, SEIICHI

Examiner

Howard Weiss

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 March 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2,4,6 and 19-24 ~~is~~ are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2,4,6 and 19-24 ~~is~~ are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 March 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

Attorney's Docket Number: 005702-20050
Filing Date: 11/30/99
Continuing Data: none
Claimed Foreign Priority Date: 11/30/98 (JPX)
Applicant(s): Mori

Examiner: Howard Weiss

Continued Prosecution Application

1. The request filed on 3/13/03 for a Continued Prosecution Application (CPA) under 37 CFR 1.53(d) based on parent Application No. 09/451,619 is acceptable and a CPA has been established. An action on the CPA follows:

Drawings

2. The corrected or substitute drawings were received on 3/13/03. These drawings are accepted.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claim 4 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 4 adds the limitation of an electric charge accumulating portion in an insulating layer having a trap level. This charge accumulating insulating layer is in addition to the floating gate described in Claim 19 from which Claim 4 depends. There is no description in the specification nor depiction in the figures of this arrangement.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Initially, and with respect to Claims 6 and 23, note that a "product by process" claim is directed to the product per se, no matter how actually made. See *In re Thorpe et al.*, 227 USPQ 964 (CAFC, 1985) and the related case law cited therein which make it clear that it is the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that, as here, an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not. As stated in Thorpe,

even though product-by-process claims are limited by and defined by 'the process, determination of patentability is based on the product itself. *In re Brown*, 459 F.2d 531, 535, 173 USPQ 685, 688 (CCPA 1972); *In re Pilkington*, 411 F.2d 1345, 1348, 162 USPQ 145, 147 (CCPA 1969); *Buono v. Yankee Maid Dress Corp.*, 77 F.2d 274, 279, 26 USPQ 57, 61 (2d. Cir. 1935).

Note that Applicant has burden of proof in such cases as the above case law makes clear.

7. Claims 2, 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lu et al. (U.S. Patent No. 6,130,452) and Kume et al. (IEDM 87).

Lu et al. show most aspects of the instant invention (e.g. Figure 1 and Column 5 Lines 15 to 41) including:

- a semiconductor substrate **104**
- a source region **120** and a drain region **118a**
- a floating gate **100, 108** provided on an insulating layer **102**

- the overlap **124a** of said drain region with the floating gate is larger than the overlap **124b** of said source region
- the erasing and writing procedures are as claimed (Column 4 Line 27 to Column 5 Line 13) including using hot electron injection (Column 5 Lines 5 to 7)

Lu et al. do not show the source junction depth being larger than the drain junction depth. Kume et al. teach (e.g. Figure 1) to have the source junction depth (the boundary between the n- layer of the source region and the p substrate) larger than the drain junction depth (the boundary between the n+ drain region and the p+ layer) to improve programming efficiency (Page 560 Column 2 second paragraph). It would have been obvious to a person of ordinary skill in the art at the time of invention to have the source junction depth larger than the drain junction depth as taught by Kume et al. in the device of Lu et al. to improve programming efficiency.

As to the grounds of rejection under section 103(a), how the source region is made (by self-alignment with a side wall or by another means) and what impurity dose quantity was use are intermediate process steps and does not affect the final device structure as claimed. See MPEP § 2113 which discusses the handling of "product by process" claims.

8. Claims 4 and 21 to 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lu et al. and Kume et al., as applied to Claim 19 above, and in further view of Okuda et al. (U.S. Patent No. 5,640,345).

Lu et al. and Kume et al. show most aspects of the instant invention (Paragraph 7) except for a electric charge accumulating portion in an insulating layer having trap level replacing the floating gate. Okuda et al. teach (e.g. Figures 1(a,b)) to a electric charge accumulating portion in an insulating layer having trap levels **11, 12, 14,15** to provide a low-voltage and high data performance device (Column 2 Lines 52 to 61). It would have been obvious to a person of ordinary skill in the art at the time of

invention to a electric charge accumulating portion in an insulating layer having trap levels as taught by Okuda et al. in the device of Lu et al. and Kume et al. to provide a low-voltage and high data performance device.

9. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lu et al. and Kume et al., as applied to Claim 19 above, and in further view of Sung et al. (U.S. Patent No. 5,631,179).

Lu et al. and Kume et al. show most aspects of the instant invention (Paragraph 7) except for the a side wall on said control gate made of two layers. Sung et al. teach (e.g. Figures 1A and 3A) to have the side wall on the control gate **14** to have two layers **28, 29'** to reduce the number of source pickups (Column 1 Lines 28 to 30). It would have been obvious to a person of ordinary skill in the art at the time of invention to have the side wall on the control gate to have two layers as taught by Sung et al. in the device of Lu et al. and Kume et al. to reduce the number of source pickups.

10. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lu et al., Kume et al. and Okuda et al., as applied to Claim 21 above, and in further view of Sung et al.

Lu et al., Kume et al. and Okuda et al. show most aspects of the instant invention (Paragraph 8) except for the a side wall on said control gate made of two layers. Sung et al. teach (e.g. Figures 1A and 3A) to have the side wall on the control gate **14** to have two layers **28, 29'** to reduce the number of source pickups (Column 1 Lines 28 to 30). It would have been obvious to a person of ordinary skill in the art at the time of invention to have the side wall on the control gate to have two layers as taught by Sung et al. in the device of Lu et al., Kume et al. and Okuda et al. to reduce the number of source pickups.

Response to Arguments

11. The Applicant's arguments filed 3/13/03 have been fully considered but they are not persuasive. The Applicants state that Kume et al. do not teach a source junction depth greater than the drain junction depth as depicted in Figure 1 of Kume et al. The Applicants state the source junction (at the boundary of the n- region and the p substrate) is the same as the drain junction depth (at the boundary of the p+ region and said substrate). However, the Applicants have mistakenly included the p+ region as part of the drain. It is commonly known in the art that a junction is defined as a boundary between areas of different conductivities. This boundary is usually called a p/n junction. The p+ region is called a p-pocket (e.g. see Pages 68 and 69 of Cappelletti et al.), is employed to prevent punch-through currents and is considered part of the substrate (i.e. part of the channel region). Therefore, the drain junction depth would be the boundary between the n+ and p+ regions and is shallower than the source junction. In view of these reasons and those set forth in the present office action, the rejections of the stated claims stand.

Conclusion

12. Papers related to this application may be submitted directly to Art Unit 2814 by facsimile transmission. Papers should be faxed to Art Unit 2814 via the Art Unit 2814 Fax Center located in Crystal Plaza 4, room 3C23. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (15 November 1989). The Art Unit 2814 Fax Center number is **(703) 308-7722** or **-7724**. The Art Unit 2814 Fax Center is to be used only for papers related to Art Unit 2814 applications. The official TC2800 Before-Final, **(703) 872-9318**, and After-Final, **(703) 872-9319**, Fax numbers will provide the fax sender with an auto-reply fax verifying receipt of their fax by the USPTO.
13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Howard Weiss at **(703) 308-4840** and between the

Art Unit: 2814

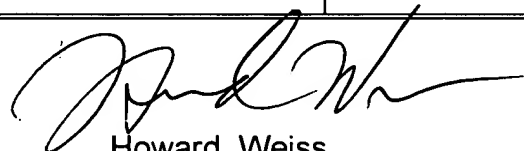
hours of 8:00 AM to 4:00 PM (Eastern Standard Time) Monday through Friday or by e-mail via **Howard.Weiss@uspto.gov**.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group 2800 Receptionist at **(703) 308-0956**.

14. The following list is the Examiner's field of search for the present Office Action:

Field of Search	Date
U.S. Class / Subclass(es): 257/ 315, 324; 438/288	thru 7/29/03
Other Documentation: none	
Electronic Database(s): EAST (USPAT)	thru 7/29/03

HW/hw
30 July 20033



Howard Weiss
Examiner
Art Unit 2814